

**Test Report**

| | | | |
|-------------------|---|---|----------------------|
| Test Location: | [] | 1. B802, No.11 Caipin Road, Guangzhou Science City, Guangzhou, Guangdong, China | |
| | [√] | 2. R108, 1 st Floor No.69 GuangPu West Road, Guangzhou Science City, Guangzhou, Guangdong, China | |
| | [] | 3. Other: | |
| Project No.: | GZO130803-09B | | Test by: Mountain Ye |
| Applicant: | Light Efficient Design, LLC | | |
| Applicant Address | 188 S. Northwest Highway, Cary, IL 60013, USA | | |
| Standard/Method | IES LM-79 2008 | | |

Test & Report By:

Mountain Ye

Mountain Ye

Date: 2013-09-02

Review By:

Tommy Liang

Tommy Liang

| Test No. | Done +++ | Test Name |
|----------|-------------|--|
| 1 | X | Electrical, Photometric and Chromaticity Measurements: |

| Model No. | Sample No. | Sample acceptance Y/N | Product Identification and Ratings |
|-------------|------------|--------------------------|---|
| LED-8045M42 | 1309024-2 | Y | LED Lamp, 120-277 Vac, 60Hz employed LED of BRIDGELUX, TYPE BXRA-40E1350-H-00 |

| Model name(s): | LED-8045M42, LED-8045M42C | Representative (Tested) Model: | LED-8045M42 | All construction are the same, except model name |
|----------------|------------------------------|-----------------------------------|-------------|--|
| | | | | |

TEST METHODS

1. Seasoning in Sample Orientation:

See IES LM-80 report (LED products) or Energy Star Report for CFL/ILL.

2. Photometric and Electrical measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

3. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at least 5 nm intervals over the range of 380 to 780 nm.

1.1 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

IES LM-79 2008

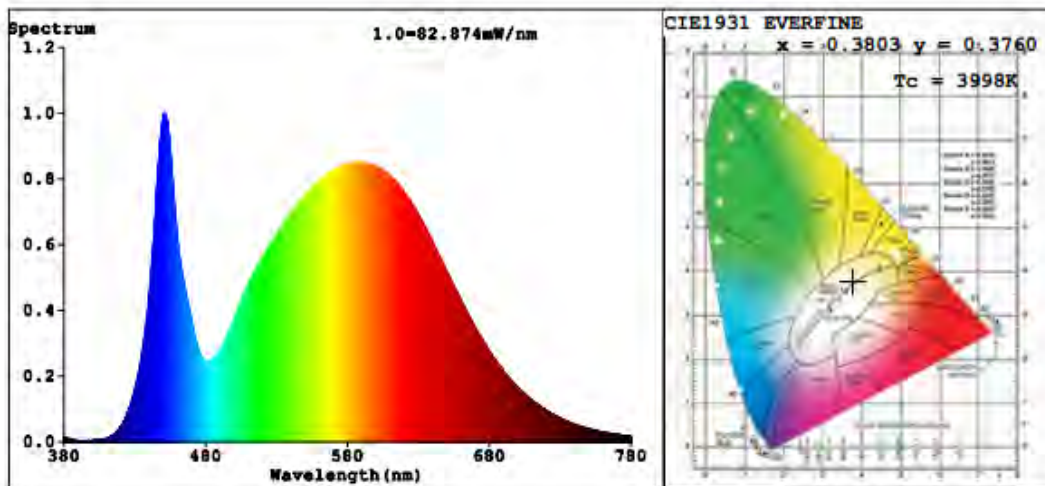
Electrical Measurement

| Test date | 2013-09-02 | | Test Ambient: | 25.5 ° C | | |
|------------|----------------|-----------------|---------------|-----------|--------------|-------|
| Sample No. | Voltage (V AC) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | THD |
| 1309024-2 | 120.0 | 60 | 0.4693 | 52.05 | 0.9244 | 6.2% |
| | 277.0 | 60 | 0.217 | 56.1 | 0.9320 | 14.5% |

Photometric and Chromaticity Measurements

| Test date | 2013-09-02 | | Test Ambient: | 25.5 ° C | | |
|-------------------------|----------------|---------------------|-----------------|----------|----|---------|
| Sample No. | Voltage (V AC) | | Frequency (Hz) | | | |
| 1309024-2 | 120.0 | | 60 | | | |
| Lumen Flux (lm) | | Efficacy (lm/w) | | CRI | R9 | CCT (K) |
| 4446 | | 85.44 | | 82.6 | 19 | 3998 |
| Chromaticity Coordinate | | | | Duv | | |
| x=0.3803 y=0.3760 | | u'=0.2253 v'=0.5012 | | -0.0003 | | |

Color Data:



Color Parameters:

Chromaticity Coordinate: x=0.3803 y=0.3760 / u'=0.2253 v'=0.5012

Tc=3998K (Duv=-0.0003) Dominant WL:Ld =579.3nm Purity=27.0%

Peak WL:Lp=450.9nm HWL:Lhd=22.4nm

Render Index: Ra=82.6 CRI=75.9

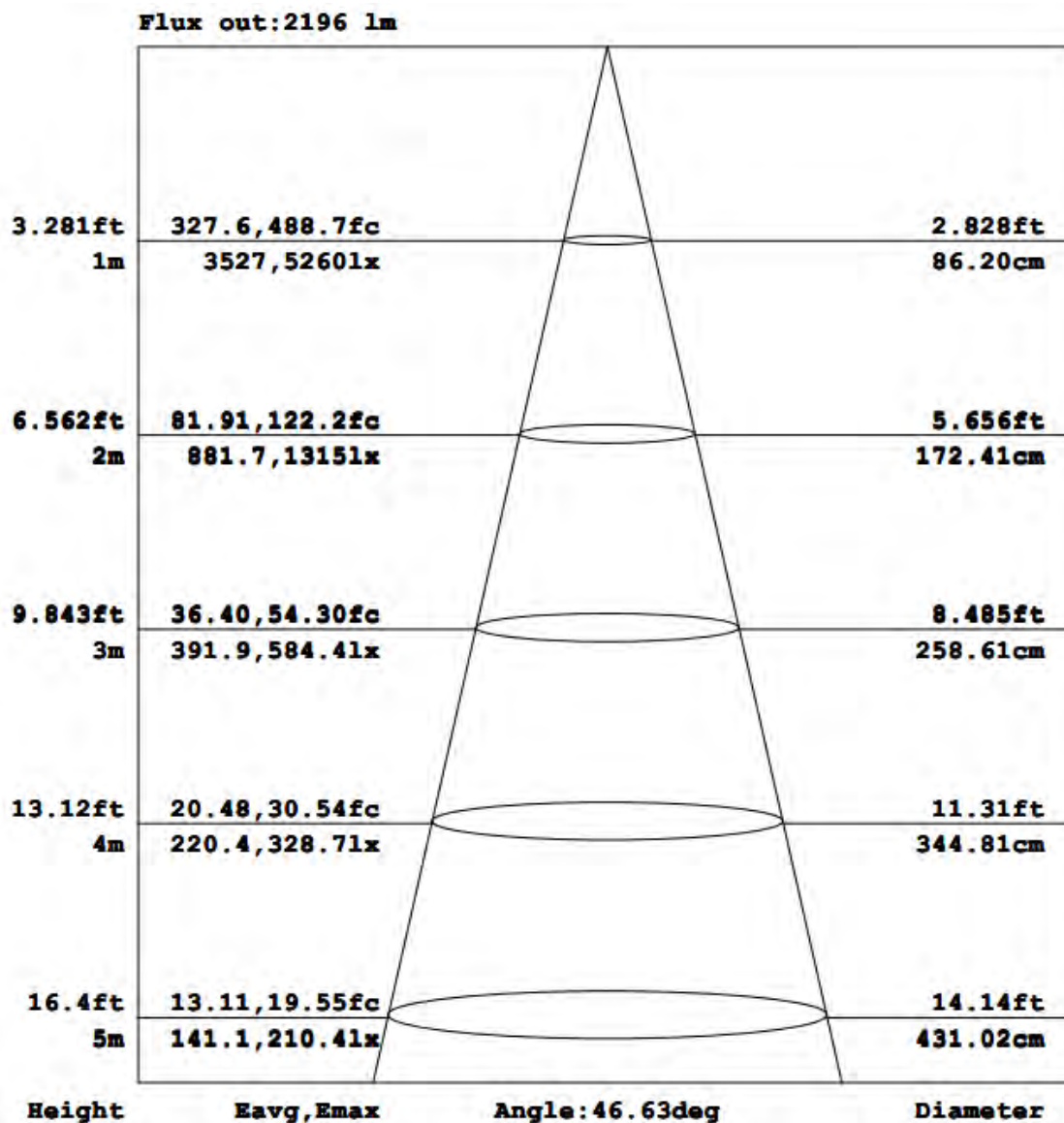
R1 =81 R2 =88 R3 =92 R4 =81 R5 =80 R6 =82 R7 =88

R8 =69 R9 =19 R10=70 R11=78 R12=58 R13=82 R14=95 R15=77

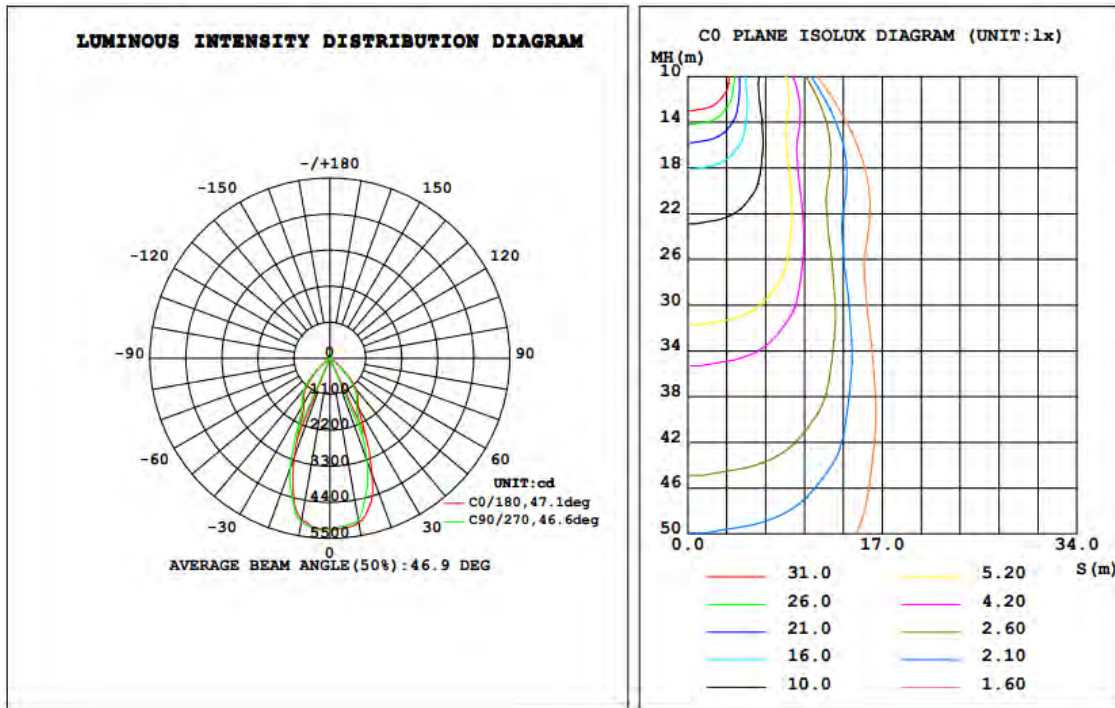
Zonal Lumen Summary

| Zone | %Lamp / Luminaire |
|----------|-------------------|
| 0 - 60 | 98.4 % |
| 60 - 90 | 1.3% |
| 0 - 90 | 99.7% |
| 90 - 180 | 0.3 % |
| 0 - 180 | 100.0 % |

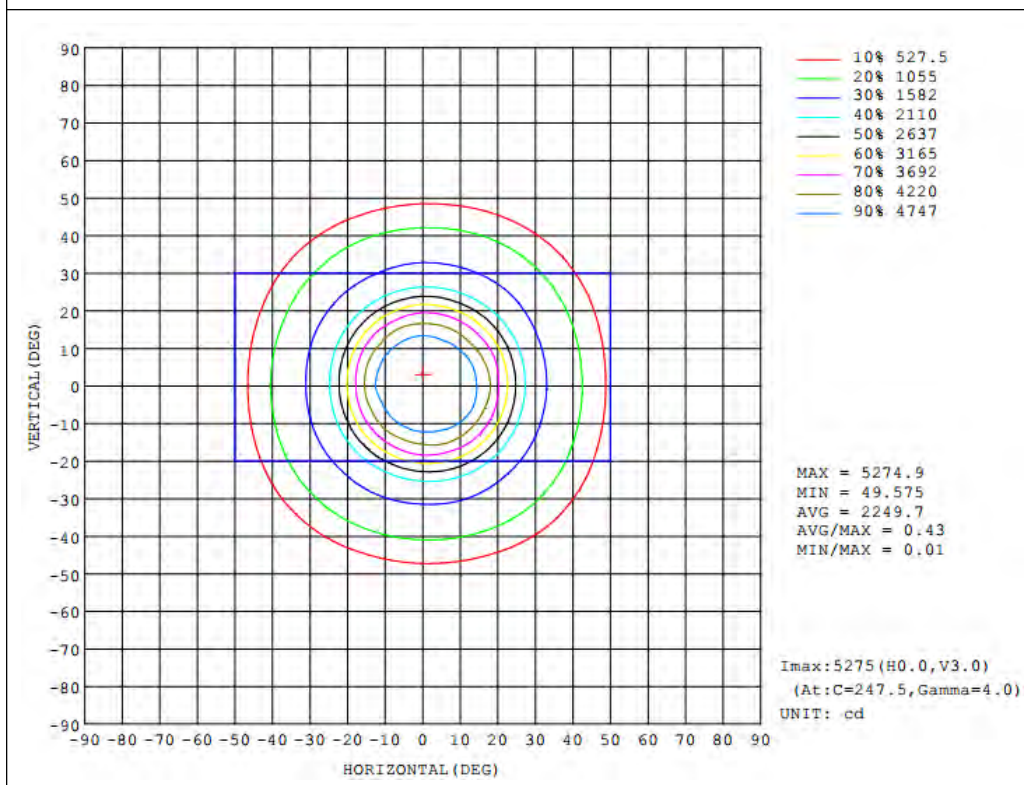
Illuminance Plots



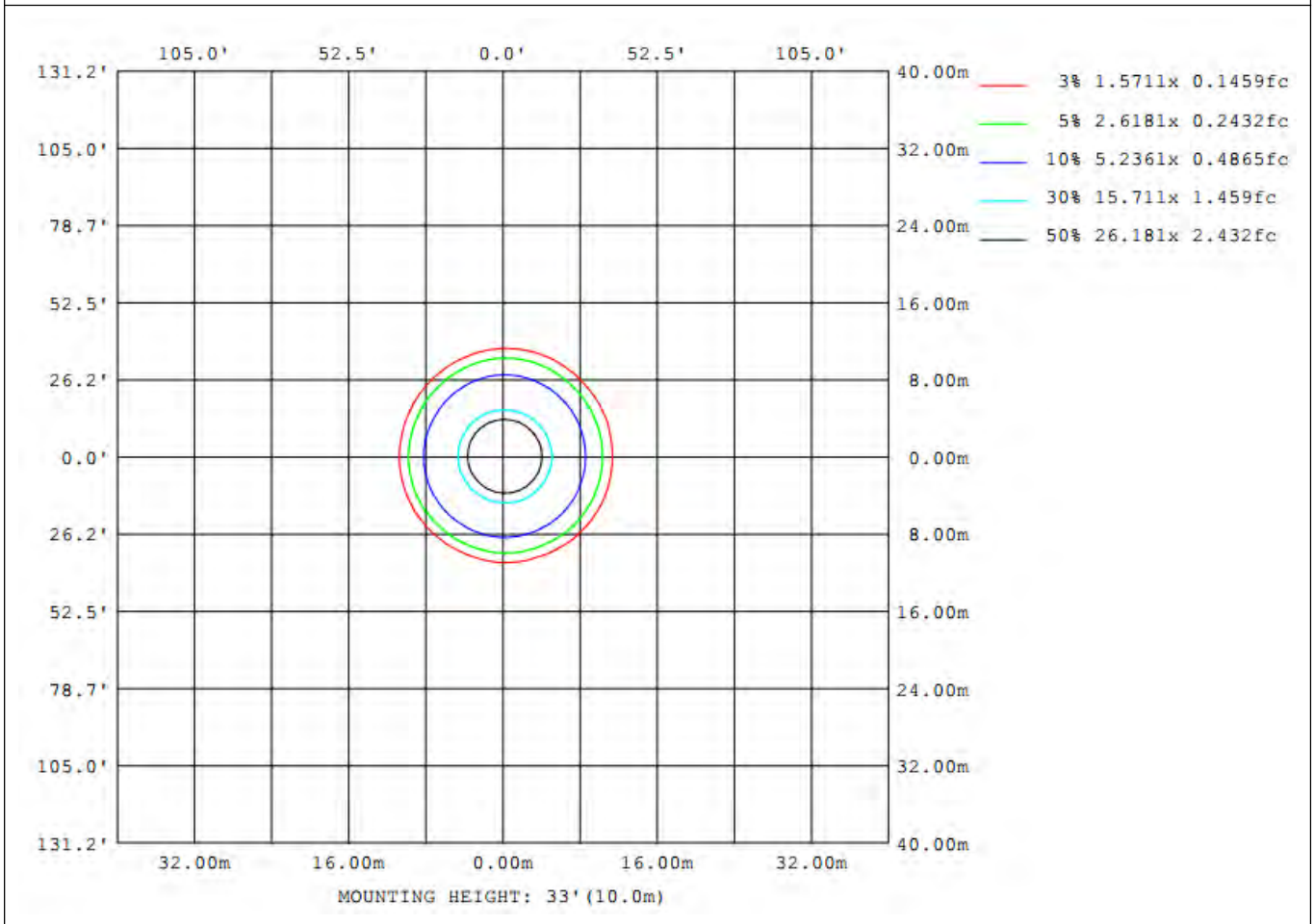
Candela Plots



ISOCANDELA DIAGRAM



ISOLUX DIAGRAM



Candela Tabulation

Table--1

UNIT: cd

| C (DEG) γ (DEG) | 0 | 23 | 45 | 68 | 90 | 113 | 135 | 158 | 180 | 203 | 225 | 248 | 270 | 293 | 315 | 338 | | | |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| 0 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | 5231 | | | |
| 5 | 5189 | 5210 | 5203 | 5180 | 5139 | 5115 | 5191 | 5199 | 5178 | 5173 | 5200 | 5280 | 5218 | 5171 | 5236 | 5249 | | | |
| 10 | 5098 | 5200 | 5076 | 5020 | 5011 | 4892 | 4916 | 5004 | 4989 | 5008 | 5154 | 5048 | 5088 | 5004 | 5059 | 5152 | | | |
| 15 | 4678 | 4680 | 4586 | 4493 | 4278 | 4222 | 4271 | 4266 | 4330 | 4372 | 4335 | 4519 | 4422 | 4487 | 4558 | 4644 | | | |
| 20 | 3757 | 3737 | 3601 | 3432 | 3307 | 3176 | 3167 | 3198 | 3187 | 3290 | 3366 | 3453 | 3559 | 3610 | 3689 | 3819 | | | |
| 25 | 2580 | 2545 | 2403 | 2297 | 2156 | 2075 | 2053 | 2063 | 2059 | 2135 | 2180 | 2269 | 2352 | 2377 | 2500 | 2587 | | | |
| 30 | 1753 | 1718 | 1669 | 1670 | 1621 | 1625 | 1615 | 1631 | 1624 | 1665 | 1671 | 1704 | 1705 | 1736 | 1774 | 1783 | | | |
| 35 | 1497 | 1491 | 1456 | 1453 | 1426 | 1402 | 1402 | 1417 | 1413 | 1427 | 1426 | 1468 | 1475 | 1492 | 1498 | 1500 | | | |
| 40 | 1230 | 1228 | 1197 | 1161 | 1132 | 1090 | 1076 | 1088 | 1094 | 1088 | 1123 | 1169 | 1211 | 1232 | 1235 | 1249 | | | |
| 45 | 847 | 840 | 803 | 750 | 717 | 663 | 661 | 669 | 664 | 666 | 702 | 771 | 824 | 850 | 844 | 859 | | | |
| 50 | 426 | 423 | 393 | 344 | 314 | 278 | 265 | 267 | 265 | 282 | 308 | 348 | 399 | 428 | 432 | 445 | | | |
| 55 | 113 | 108 | 94.9 | 75.3 | 67.5 | 57.9 | 58.2 | 61.1 | 59.2 | 63.8 | 72.1 | 84.2 | 100 | 114 | 120 | 118 | | | |
| 60 | 37.8 | 37.4 | 36.2 | 34.3 | 32.4 | 31.6 | 31.9 | 32.6 | 32.4 | 33.0 | 34.8 | 37.3 | 37.4 | 36.9 | 38.1 | 38.8 | | | |
| 65 | 26.9 | 26.7 | 25.7 | 25.9 | 25.2 | 25.3 | 25.5 | 25.1 | 24.5 | 24.6 | 25.7 | 27.7 | 27.6 | 27.2 | 27.5 | 27.5 | | | |
| 70 | 22.5 | 22.1 | 21.8 | 21.5 | 21.3 | 21.4 | 21.1 | 20.6 | 19.5 | 19.5 | 20.6 | 22.0 | 22.1 | 22.1 | 22.5 | 22.6 | | | |
| 75 | 19.4 | 19.4 | 18.9 | 18.8 | 18.3 | 18.0 | 18.0 | 17.4 | 16.3 | 16.1 | 16.7 | 18.0 | 18.4 | 18.7 | 19.5 | 19.2 | | | |
| 80 | 17.1 | 17.2 | 16.7 | 16.2 | 15.4 | 15.3 | 15.2 | 14.6 | 13.1 | 12.8 | 13.5 | 14.9 | 15.8 | 16.1 | 16.6 | 16.6 | | | |
| 85 | 11.1 | 10.9 | 10.4 | 9.77 | 9.25 | 8.96 | 8.85 | 8.61 | 7.27 | 7.35 | 7.67 | 8.55 | 9.55 | 10.1 | 10.6 | 10.9 | | | |
| 90 | 2.37 | 1.89 | 0.22 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.19 | 2.28 | 2.58 | | |
| 95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 100 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 105 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 110 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 115 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 120 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 125 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.52 | 0.52 | 0.52 | 0.42 | 0.42 | 0.26 | 0.26 | 0.26 | | |
| 130 | 0.36 | 0.47 | 0.37 | 0.47 | 0.47 | 0.52 | 0.57 | 0.42 | 1.36 | 1.31 | 1.31 | 1.26 | 0.99 | 0.99 | 0.99 | 0.84 | | | |
| 135 | 1.19 | 0.99 | 1.19 | 1.26 | 1.20 | 1.34 | 1.35 | 1.36 | 2.40 | 2.41 | 2.40 | 2.16 | 2.04 | 1.87 | 1.93 | 1.95 | | | |
| 140 | 1.97 | 1.88 | 2.09 | 2.10 | 2.09 | 2.22 | 2.39 | 2.47 | 3.60 | 3.61 | 3.60 | 3.42 | 3.19 | 3.06 | 3.08 | 3.00 | | | |
| 145 | 3.12 | 3.28 | 3.54 | 3.61 | 3.70 | 3.82 | 3.80 | 3.99 | 5.54 | 5.49 | 5.33 | 5.20 | 4.86 | 4.41 | 4.59 | 4.57 | | | |
| 150 | 4.95 | 5.21 | 5.31 | 5.35 | 5.42 | 5.53 | 5.82 | 5.88 | 7.98 | 7.94 | 7.62 | 7.51 | 7.16 | 6.63 | 6.83 | 6.73 | | | |
| 155 | 6.67 | 6.99 | 6.99 | 7.19 | 7.30 | 7.34 | 7.80 | 7.87 | 10.4 | 10.3 | 10.1 | 9.87 | 9.61 | 9.11 | 9.12 | 9.24 | | | |
| 160 | 8.34 | 8.45 | 8.65 | 8.71 | 8.76 | 9.00 | 9.21 | 9.49 | 12.0 | 12.0 | 11.8 | 11.8 | 11.4 | 10.9 | 10.9 | 10.9 | | | |
| 165 | 9.90 | 10.1 | 10.3 | 10.4 | 10.5 | 10.7 | 10.7 | 11.3 | 13.4 | 13.5 | 13.4 | 13.5 | 13.0 | 12.6 | 12.6 | 12.6 | | | |
| 170 | 12.0 | 12.1 | 12.3 | 12.3 | 12.3 | 12.7 | 12.8 | 13.1 | 15.1 | 15.2 | 14.9 | 15.0 | 14.8 | 14.4 | 14.4 | 14.5 | | | |
| 175 | 15.4 | 15.5 | 15.6 | 15.8 | 15.7 | 15.7 | 15.9 | 16.3 | 17.1 | 17.1 | 17.2 | 17.2 | 16.8 | 16.7 | 16.8 | 16.9 | | | |
| 180 | 16.4 | 16.5 | 16.6 | 16.6 | 16.4 | 16.4 | 16.4 | 16.7 | 16.3 | 16.4 | 16.4 | 16.6 | 16.4 | 16.2 | 16.5 | 16.6 | | | |

Annex (Photo of Products):



Test Equipment

| Equipment ID | Equipment Name | Last Calibration Date | Next Calibration Date |
|--------------|---------------------------------------|-----------------------|-----------------------|
| ST-R-336 | 2 meter Integrating Sphere | 2013-07-08 | 2014-07-07 |
| ST-R-331 | Spectral analysis system HAAS-2000 | 2013-06-21 | 2014-06-20 |
| D204 | Standard Lamp | 2013-06-28 | 2014-06-27 |
| PF2010 | Power Meter for Integrating Sphere | 2013-06-20 | 2014-06-19 |
| EE-09 | Goniophotometer system | 2013-06-21 | 2014-06-20 |
| D908S | Standard Lamp | 2013-07-05 | 2014-07-04 |
| PF210 | Power Meter for Goniophotometer | 2013-06-20 | 2014-06-19 |

***** END OF DATASHEET PACKAGE *****